Summary of Fish Agencies' Modeling Exercise
May 31, 2012

In late April 2012, the fish agencies (DFG, FWS and NMFS) were asked by the Department of Water Resources to define a set of initial operational criteria that could meet the needs of BDCP covered fish species, based on current science and with the assumption that any benefits of habitat restoration and other conservation measures would not be realized by the time the project was operational. DWR requested that the three fish agencies work with CH2MHill (Armin Munevar) to model those criteria using CalSim. CH2MHill developed a framework for completing this exercise that was reviewed and generally agreed to by the fish agencies. This framework built on discussions that occurred at an April 12, NGO technical meeting.

The team followed the following general process:

1) Biologists from DFG, FWS and NMFS identified riverine and estuary flow and storage conditions for a subset of BDCP covered species or species group (winter-run Chinook, spring-run Chinook, fall-run Chinook, San Joaquin salmonids, delta smelt, longfin smelt, green and white sturgeons) that would be sufficiently protective to avoid jeopardy and make a contribution to recovery. The agencies spent time discussing this standard conceptually in order to calibrate across agencies and individual biologists. Initially, each species or species group was treated separately without attempting to balance operations with other species or other beneficial uses.

2) Working together across agencies, the biologists used scientific literature, data reports, previous evaluations and their professional judgment to develop criteria that they deemed to be of high to critically high importance to each species or species group. They also ranked the relative uncertainty in the science for each criterion. Uncertainty included scientific uncertainty of the physical or biological mechanism, the specific value selected and the degree to which Calsim was able to accurately predict or capture the mechanism. It was noted that some criteria may not be precisely defined or may be difficult to represent using CalSim.

3) The team also developed metrics for some species, which were not criteria that Calsim would operate to, but were outputs from Calsim that would be evaluated and assessed, primary to discern whether there were any unintended consequences of re-operations.

4) CH2MHill modeled operational criteria for each of the seven target species and species groups individually. The team then evaluated the outputs of these runs, and refined the criteria in some cases.

5) The team then developed several 'combined species runs' considering synergies and trade-offs among species, in an attempt to find one that met all the needs of all the species. Several initial runs highlighted trade-offs between upstream storage and outflow. CH2MHill and the biologists engaged in discussions regarding these Calsim outputs, and used their combined expertise to refine the species criteria in some cases to minimize trade-offs without sacrificing critical protections.

6) This exercise culminated in "combined species run 5" which met outflow criteria without worsening

Shasta storage (cold water pool management necessary for Winter-run Chinook) criteria relative to the current RPA baseline. This was achieved by prioritizing export reductions over releases from storage to meet outflow criteria and by protecting storage at Shasta, relative to other upstream reservoirs. The agencies concluded that this was a successful run that should be evaluated further, even though not all the criteria for all the species were attained that would allow for a contribution to recovery due to constraints in the system.

7) The fish agencies prepared a color-coded visual diagram to plot the relative importance and uncertainty of the criteria for each species. This plot assisted the agencies in understanding synergies and tradeoffs relative to importance to each species.

8) CH2MHill prepared additional sensitivity analyses through various combined species runs that explored some of the incremental effects of the criteria and the identified uncertainties. These runs were prepared without input from the fish agencies and were intended to assist the Agency Principals in understanding the sensitivity of outputs relative to adjusted inputs.

Notes:

None of the runs attempted to maintain a particular water supply. None of the operational scenarios were developed in cooperation with the federal or state operating agencies, as typically occurs when developing recommendations for operations under section 7 of the ESA. These operating scenarios should therefore be construed as a rough first pass at the issues, and not a refined product that would necessarily emerge from a section 7 consultation. The individual species runs were initially completed with a 9,000 cfs new North delta diversion capacity. Sensitivity analyses included 15,000 cfs capacity. This exercise was conducted quickly and should be evaluated further. For example, Oroville reoperations should be evaluated for effects on spring-run in the Feather River.

The fish agencies engaged in this exercise at the request of DWR and in an effort to provide technical advice to the applicant on an initial range of operations that could possibly be permittable. What is ultimately deemed to be permittable by any of the regulatory agencies will depend on acceptance of a full application, including an adaptive management plan. The application will be evaluated based on legal requirements, including best available scientific and commercial information at the time of permitting. The agencies will evaluate all conservation measures in the BDCP when it is submitted. This future evaluation will include any anticipated benefit of habitat and other measures proposed as part of BDCP.